

REMARKS

In the Final Office Action mailed on February 20, 2007, the Examiner took the following action: (1) rejected claims 1-3 and 12-14 under 35 U.S.C. §102(b) as being anticipated by Waldrop (U.S. Application 2002/0022422) and (2) rejected claims 1-19 under 35 U.S.C. §103(a) as being unpatentable over Mead (U.S. 6,620,369) in view of Waldrop. Claims 12-17 and 19 are amended. Applicants respectfully request reconsideration of the application in view of the foregoing amendments and the following remarks.

I. Rejections under §102(b) and §103(a)

Claims 1-3 and 12-14 are rejected under 35 U.S.C. §102(b) as being anticipated by Waldrop, and claims 1-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mead (U.S. 6,620,369) in view of Waldrop.

Claims 1-11

As amended, claim 1 recites:

1. A method of processing a composite component, comprising:
providing a lay-up mandrel having a non-planar portion;
forming a prepreg material on the non-planar portion of a lay-up mandrel;
providing an elastomeric caul over the prepreg material in an initial position such that a first portion of the elastomeric caul is proximate the prepreg material on the lay-up mandrel, and a second portion of the elastomeric caul adjacent the first portion is spaced apart from the prepreg material;
reducing a pressure within a space disposed between the elastomeric caul and the lay-up mandrel proximate the non-planar portion; and
simultaneously with the reducing of the pressure with the space, stretching the elastomeric caul into a second position such that the second portion of the elastomeric caul is drawn into continuous engagement with at least one of the prepreg material and the lay-up mandrel. (emphasis added).

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Waldrop (U.S. Application 2002/0022422)

Waldrop teaches a liquid molding process and system for producing quality composite structures. (Paragraph 32, Lines 1-3). Waldrop teaches a double bag vacuum infusion process to improve the stiffness of the bagging material to avoid relaxation behind a resin wave front, thereby permitting the infusion of void-free composites having the high fiber volumes desired for aerospace applications. (Paragraph 33, Lines 3-7).

Significantly, Waldrop notes that “bag bridging can occur over the preform at discontinuities” and that “a low modulus *reduces localized bag stresses on the preform* which otherwise can cause tapering, distortion, or perform damage.” (Para. 143) (emphasis added). Waldrop proposes that “*shaping the bag to conform with the contour of the preform [mitigates undesirable effects] from bag induced stresses.*” (Para. 143) (emphasis added).

Applicants respectfully submit that claim 1 is patentable over Waldrop. Specifically, Waldrop does not teach or suggest a method that includes, in relevant part, providing an elastomeric caul over the prepreg material in an initial position such that ... “a second portion of the elastomeric caul adjacent the first portion is spaced apart from the prepreg material,” and “*simultaneously with the reducing of the pressure with the space, stretching the elastomeric caul into a second position such that the second portion of the elastomeric caul is drawn into continuous engagement with at least one of the prepreg material and the lay-up mandrel.*” (emphasis added). Waldrop fails to teach or fairly suggest these limitations.

More specifically, Waldrop acknowledges that “bag bridging can occur,” which is one of the aspects of prior art methods that Applicants’ disclosure is intended to address. Waldrop fails, however, to teach or suggest an elastomeric caul that is configured to stretch such that the second (or bridged) portion of the caul is drawn into continuous engagement with the underlying preform material. Rather, Waldrop teaches that the bridging may be overcome by “*shaping the*

bag to conform with the contour of the preform [mitigates undesirable effects] from bag induced stresses.” (Para. 143) (emphasis added). Such shaping of the bag as taught by Waldrop is prior to the reduction of pressure within the space between the caul and the preform, and is more aptly termed “pre-shaping.”

Even though Waldrop teaches using a “low modulus” for the inner bag, Waldrop fails to teach that the “*caul is drawn into continuous engagement with at least one of the prepreg material and the lay-up mandrel,*” but rather, according to Waldrop, the low modulus only “*reduces localized bag stresses on the perform.*” (Para. 143) (emphasis added). Waldrop especially does not teach or suggest “*simultaneously with the reducing of the pressure with the space, stretching the elastomeric caul into a second position such that the second portion of the elastomeric caul is drawn into continuous engagement with at least one of the prepreg material and the lay-up mandrel.*” (emphasis added). For these reasons, claim 1 is not taught or suggested by Waldrop.

Mead (U.S. 6,620,369)

Mead fails to remedy the above-noted deficiencies of Waldrop. Specifically, Mead teaches a method of forming a resin composite part utilizing a mold surface for mitigating post-cure machining of the resin composite part. (2:29-32). The method provides for forming a resin preform having a peripheral geometry similarly sized and configured as a configuration of the mold surface. (2:32-34). The resin preform is cured to form the resin composite part with the resin composite part being confirmed to the configuration of the mold surface for mitigating post-cure machining of the resin composite part. (2:34-38).

Mead is silent as to the issue of “bridging.” Mead is particularly silent as to the desirability of method of forming a composite component using an elastomeric caul that includes “*simultaneously with the reducing of the pressure with the space, stretching the elastomeric caul*

into a second position such that the second portion of the elastomeric caul is drawn into continuous engagement with at least one of the prepreg material and the lay-up mandrel.” (emphasis added). For these reasons, claim 1 is not taught or suggested by Mead, either singly or in any properly motivated combination with Waldrop.

No Motivation to Combine

Although Applicants have demonstrated that Waldrop and Mead, either singly or in any properly motivated combination, fail to teach or suggest the method recited in claim 1, Applicants also deem it worthwhile to note that the cited references (Waldrop and Mead) cannot properly be combined in the manner suggested by the Examiner in formulating the rejections of claims 1-19 under 35 U.S.C. §103(a). It is improper to combine Waldrop and Mead in the manner proposed by the Examiner due to the inconsistent teachings of these references.

As noted above, Waldrop teaches that an inner bag may be used, and that the inner bag may have a low modulus and may be shaped. (Para 143). On the other hand, Mead teaches a mold 10 having a recess 70 sized to conform to the conform to the dimensions of the desired composite part 30, such that “‘damming materials’ *such as rubber cauls* and tapes” are not needed. (4:64-5:3). (emphasis added).

Where, as here, a first reference (Waldrop) teaches aspects of elastomeric cauls, and a second reference (Mead) teaches that a desirable aspect is to eliminate elastomeric cauls, there is no proper motivation to combine the teachings of such references. If a proposed combination of references would render the prior art being modified “unsatisfactory for its intended purposes, then there is no suggestion or motivation to make the proposed modification.” M.P.E.P. §2143.01 (citations omitted).

“The PTO bears the burden of establishing a case of *prima facie* obviousness.” *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529 (Fed. Cir. 1993). “Obviousness can only be

established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.” *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Applicants respectfully submit that there is no motivation to combine Waldrop and Mead in the manner proposed by the Examiner.

Dependent claims

For the foregoing reasons, claim 1 is allowable over Waldrop and Mead, either singly or in any properly motivated combination. Claims 2-11 depend from claim 1 and are allowable at least due to their dependencies on claim 1, and also due to additional limitations recited in those claims. For example, claim 3 recites the method of Claim 1, wherein providing an elastomeric caul over the prepreg material in an initial position includes *providing a stretchable elastomeric caul wherein, in a relaxed state, the elastomeric caul is not shaped to conform to the non-planar portion*. These additional limitations are also not taught or fairly suggested by the cited references.

Claims 12-19

Similarly, claim 12 recites:

12. A method of manufacturing an aircraft component, comprising:
 - forming a composite material on a non-planar portion of a mandrel;
 - providing an elastomeric caul over the composite material in an initial position such that a first portion of the elastomeric caul is proximate the composite material on the lay-up mandrel, and a second portion of the elastomeric caul adjacent the first portion is spaced apart from the composite material;
 - reducing a pressure within a space disposed between the elastomeric caul and the lay-up mandrel proximate the non-planar portion;

simultaneously with the reducing of the pressure with the space, stretching the elastomeric caul into a second position such that the second portion of the elastomeric caul is drawn into continuous engagement with at least one of the composite material and the lay-up mandrel; and curing the composite material. (emphasis added).

For the reasons set forth above, Applicants respectfully submit that claim 12 is patentable over Waldrop and Mead, either singly or in any properly motivated combination. Specifically, neither Waldrop or Mead teaches or suggests a method that includes, in relevant part, providing an elastomeric caul over the prepreg material in an initial position such that ... “a second portion of the elastomeric caul adjacent the first portion is spaced apart from the prepreg material,” and “*simultaneously with the reducing of the pressure with the space, stretching the elastomeric caul into a second position such that the second portion of the elastomeric caul is drawn into continuous engagement with at least one of the prepreg material and the lay-up mandrel.*” (emphasis added). Accordingly, claim 12 is allowable.

Also, for the reasons set forth above, there is no proper motivation to combine the teachings of Waldrop with those of Mead in the manner proposed by the Examiner due to the contradictory teachings of these references. Because the proposed combination of references would render the prior art being modified “unsatisfactory for its intended purposes, then there is no suggestion or motivation to make the proposed modification.” M.P.E.P. §2143.01 (citations omitted).

Claims 13-19 depend from claim 12 and are allowable at least due to their dependencies on claim 12, and also due to additional limitations recited in those claims. For example, claim 13 recites the method of Claim 12, wherein providing an elastomeric caul over the prepreg material in an initial position includes *providing a stretchable elastomeric caul wherein, in a relaxed state, the elastomeric caul is not shaped to conform to the non-planar portion.* These additional limitations are also not taught or fairly suggested by the cited references.

CONCLUSION

Applicants respectfully submit that pending claims 1-19 are now in condition for allowance. If there are any remaining matters that may be handled by telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

Respectfully Submitted,

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